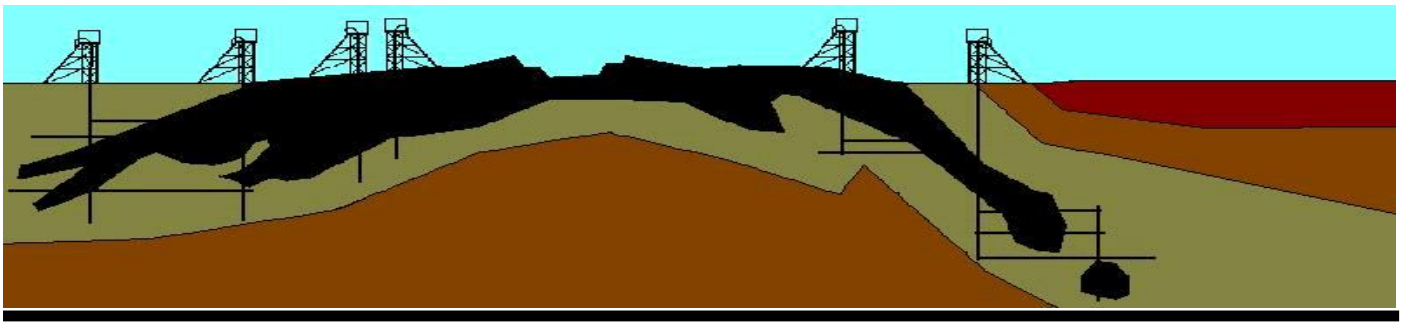
THE LINE FROM THE LODE



Volume 11, Issue 1 March 2010

The Newsletter of The Broken Hill Mineral Club Inc.

PO Box 747 Broken Hill. NSW. 2880. (ABN:11502101481)

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NOTICE

The April General Meeting has been bought forward to Wednesday the 31st of March, due to the normal meeting date being over the Easter holiday period

SUBSCRIPTIONS

2010 Annual Membership to the Broken Hill Mineral Club Inc. is as follows

Full Membership - $25
Associate Membership - $15
Family Membership - $40
Child Under 16 - $5
Newsletter Subscription - $5

WELCOME TO 2010

With the start of a new year we have a major reshuffle of the club executive committee.

The results of the elections at the AGM in February are as follows: Trevor Dart has taken the position of President with Hal Murray as Vice President. We have not yet filled the position of Secretary however, David Lee has taken the job as Treasurer.
Greg Murray is still the club Librarian and he has also taken on the role as Publicity Officer.
Trevor Dart has continued to be the Senior Field Officer with Daniel Groves as the Assistant Field Officer.

This year we have a number of things happening. Soon we will be fitting out the clubroom to set up the cutting machines and open it to the public. We still need water connected and this will hopefully be rectified in the next few weeks. The display cases donated by the Geocentre have been set up and now all we need to do is fill them with samples. They are unlit at the moment but this will change once we work out the best method to do so. There are also a lot of unnecessary items in the room so once we have the benches built and set in place we can offload the excess we don't really need.

The field trip calendar for the year has been put forward pending final negotiations with the landholders. There is a mix of old favourites plus some new areas that need checking out. You will notice that there is a slight change from the calendar in the last newsletter as we have swapped Corona and Fairy Hill. Fairy Hill on Yancowina Station is unavailable to be visited at this moment as the owner passed away at the end of last year and the family are still working out the management situation. Hopefully we will be able to visit this location later in the year.

The Rock-On dates have been set for late September and will once again be held out at the Racecourse, using the new Pavilion / Events Centre. This event was a success last year despite the dust and all that attended made noises that they were keen to return this year.

Finally, don't forget the club website at brokenhillmineralclub.wikispaces.com for more information and news on the club's activities.

CLUB CONTACT DETAILS

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LOCATION UPDATE - GINKGO & SNAPPER

BEMAX RESOURCES LIMITED. HEAVY MINERAL SAND MINES

The Ginkgo and Snapper heavy mineral sand deposits near Pooncarie NSW, have been recently developed into operating mines by Bemax Resources Limited. For those interested in what has happened so far and an insight as to what is to come, here is a brief report.

The potential for heavy mineral sand deposits in the Murray Basin was first realised during sand mining in the Kerang district of Victoria. Following depleting deposits on the eastern seaboard, focus turned to the Murray Basin as the best and most easily accessible area to find new deposits of heavy mineral sands. Regional mapping and magnetic exploration discovered a number of ancient strandline dune complexes containing deposits of heavy minerals.

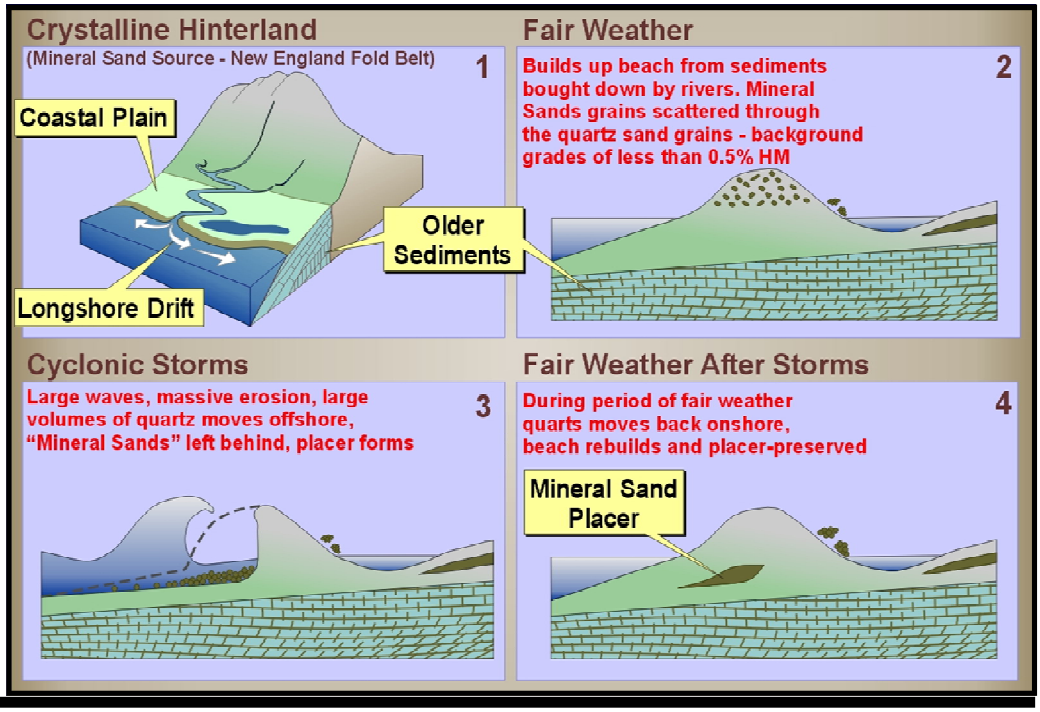
The Murray Basin itself covers 300,000 km^2 of New South Wales, Victoria and South Australia, extending for 600km from the current South Australian coastal regions to the foothills of the Barrier Ranges at Broken Hill.

Approximately five million years ago the area was under a retreating shallow sea. Large ocean swells and prevailing south-westerly winds formed several beach barrier systems with the subsequent deposition of heavy mineral sands on these beaches. Transgression and regression due to sea level fluctuations resulted in a multitude of beaches being formed. The coarse-grained heavy mineral deposits that had formed on these beaches are of interest to mining companies, as these types of deposits are not metallurgically difficult to process.

Bemax Resources Ltd has enjoyed considerable success in discovering and defining prospective heavy mineral deposits in their Murray Basin tenements, including the two currently working deposits of Ginkgo and Snapper.

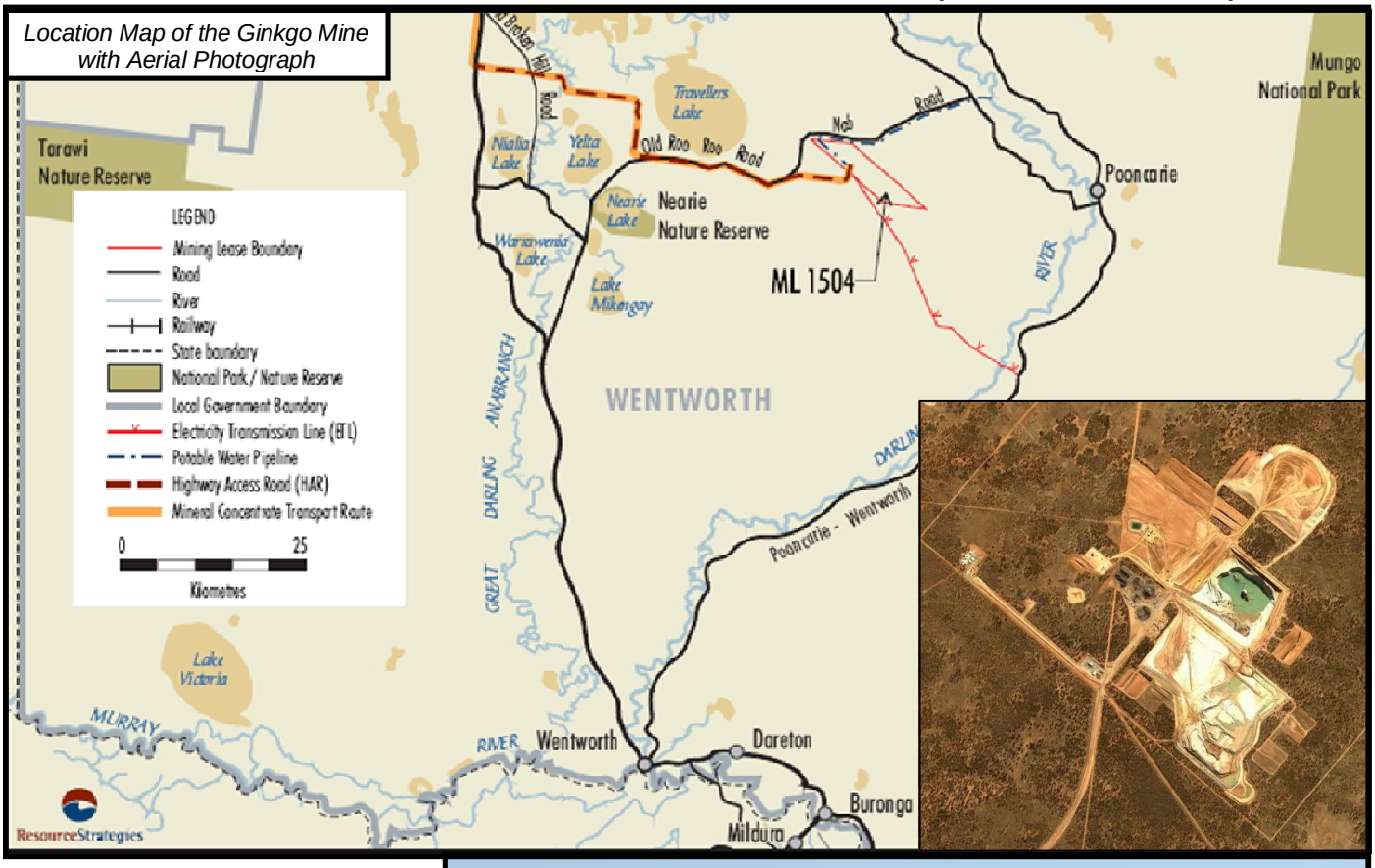
The heavy mineral (HM) sand fraction is extracted by means of a wet separation process, based on both gravity and magnetism. A pit is dug to the level of the mineral sand layer and this pit is partially filled with water. A dredge sucks up the sand from the bottom of the pit and transfers it to a floating Wet Plant Concentrator where the light sand is removed to leave the heavy fraction. In this plant the HM sand is upgraded from 5% to 95% HM content. This concentrate is then sent from the pit to the Wet High Intensity Magnetic Separator to split the magnetic fraction - ilmenite from the non-magnetic - zircon, leucoxene and rutile. The light sand fraction once removed is put back into the pit, backfilling the previously mined areas. This allows the pit to slowly migrate along the strike length of the ore deposit while overburden along with topsoil from the leading edge is put back over previously mined areas and rehabilitated.

Economic heavy mineral deposits are formed by the action of ocean waves reworking sand dunes during times of rough weather. The heavy minerals - ilmenite, rutile, zircon and leucoxene are washed to the beachfront by rivers and are then interspersed in the sands that become deposited along the beach. Prevailing winds blow the sand up into dune systems along the beachfront. When the weather turns rough, storm surges gouge at the dunes and sort the lighter sand out from the heavy minerals that then fall to the bottom and are concentrated.



LOCATION UPDATE - BEMAX MINE (CONTINUED)

Location Map of the Ginkgo Mine with Aerial Photograph



These non-magnetic concentrates are then trucked to the Mineral Separation Plant (MSP) in Broken Hill where any remaining light sand and ilmenite are removed, prior to shipping of the final product.

The Ginkgo deposit has a proven resource of 135 million tonnes at 3.6% HM with a probable extra resource of 52 million tonnes at 1.0% HM. Snapper is smaller but richer having a resource of 99 million tonnes at 5.4% HM content.

Both of these mines have had major investment put in to get them up and running. With around $170 million already spent to reach production stage and an expected 18 year mine life this venture has become a new stage in the future of the Broken Hill district.

On a mineral collecting note, the HM sand is fine grained and weathered, hence good aesthetic samples of the minerals will not be found. Pliocene fossils may be encountered from time to time, but these will be very rare indeed and probably not normally collected.

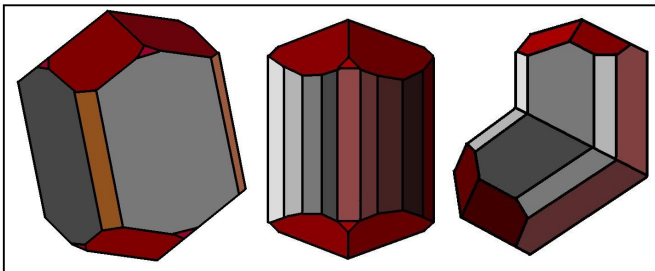
Above: *The Wet Plant Concentrator sitting in the main pit.*
Left: *Stockpile of non-magnetic fraction containing rutile, zircon and leucoxene.*
Previous Page Top: *The dredge floating in the main pit.*
Previous Page Bottom: *Diagrammatic explanation on the formation of Heavy Mineral Placer deposits in beach dune strandlines.*

MINERAL PROFILE - RUTILE

With the discovery and the development of the extensive mineral sand deposits between Broken Hill and Mildura by Bemax Resources Limited, this is the first article in a series that looks at the individual minerals found at these deposits in a little more detail.

The mineral rutile is quite a common mineral world wide, however good crystals and concentrated deposits are relatively rare. Primary rutile is found in many igneous and metamorphic terrains, however the most important economic deposits of rutile are the large secondary heavy mineral sand deposits found in sedimentary environments.

Chemically, rutile is titanium dioxide (TiO_2). It is tetragonal in crystal shape and is the most common naturally occurring form of titanium dioxide. There are two polymorph minerals of titanium dioxide in anatase - another tetragonal form with pseudo-octahedral habit and brookite - the orthorhombic form. Rutile crystals occur in two basic forms, prismatic crystals or acicular crystals. The prismatic crystals may be either long and slender or short and stubby. These tend to appear reddish brown or dark grey to black in colour and show a distinctive metallic sheen. In reflected light these crystals often show the brilliant red hue that rutile is most famous for and this is the source of its name - from the Latin - *rutilus*, meaning red.



Three common crystal forms of prismatic rutile.
Left - the square tetragonal crystal form.
Middle - the barrel like rounded crystal form.
Right - twinned square tetragonal form.

The acicular form of rutile exists as fine needles or stunning radiating sprays, sometimes enclosed in other minerals such as quartz. Here the rutile may be a brilliant golden colour and when found in this form it is referred to as sagenite.

Rutile is a relatively hard mineral rated around 6-6.5 on Moh's Scale. This along with a specific gravity of 4.25, make it likely to be accumulated during sedimentary processes and the action of running water. It is via these processes that the large beach sand heavy mineral deposits form. The Ginko and Snapper deposits currently being mined near Pooncarie NSW by Bemax Resources Limited have formed as stranded beach dune systems. These beach dune systems were deposited and reworked by wave action to produce the heavy mineral layers, as sea levels fluctuated and then retreated from the Murray Basin during the Pliocene Epoch (2.5 - 5 million years ago). The rutile along with other heavy minerals were washed into the area by ancient rivers, from regions such as Broken Hill and Cobar.

Rutile forms primarily in igneous rocks, when the melt has a higher percentage of titanium rich fluids. These fluids often differentiate to form as isolated pods of crystalline rutile within the solidifying melt and as such there may be high concentrations in one area and little rutile in the surroundings. When these pods form the crystals can be of great size and spectacular shape. Quartz is the most common accessory mineral with the rutile and as such some of the best crystals form in quartz veins.

Many of the noted Australian occurrences of rutile are associated with ancient Precambrian pegmatite terrains such as the Harts Ranges in the Northern Territory, the Broken Hill region of Western NSW and the Olary, Mount Painter and Mount Crawford districts of South Australia. In these areas late stage pegmatites and granites have intruded high grade metamorphic rocks and in doing so produced numerous quartz veins stringing off into the surroundings.

The Broken Hill district has a number of locations where rutile in crystal form can be found. Each are small and usually isolated pockets. A few quartz veins in the Thackaringa Hills have contained rutile crystals. One location was discovered over 50 years ago by a local mineral collector after following a trail crystal fragments up a creek to their source. This outcrop has yielded without doubt the best rutile crystals found in the whole district, all of which came from an area roughly two square metres in size. A second location is on the Silverton Common within a thin pegmatite outcrop only around four metres long. Here the rutile occurs as pods of coarse rutile chunks in the quartz, however in some places along con-

MINERAL PROFILE - RUTILE (CONTINUED)

RUTILE CRYSTALS FROM THE BROKEN HILL DISTRICT

Across the Top: *Two rutile crystals from the Thackaringa locality, with a photograph of the crystals in photo two - in situ, prior to extraction. Single crystal is 40 mm long, matrix piece has a 30 mm crystal across the top.*
Bottom Left: *Polished slice of rutile pegmatite from the Silverton Common locality - FOV: 12 cm across.*
Bottom Right: *Two 20 mm across, pieces of quartz with plates of fine reticulated rutile crystals from adjacent to the Menindee Road.*

tact planes the crystal faces are very well defined and display complex reticulated growth. A third location lies adjacent to the Menindee Road, on Huonville Station. This spot is a mystery as there was no outcrop of the rutile bearing quartz, but numerous rutile in quartz shards littering the ground and again the whole area is no bigger than a few square metres.

Across the border into South Australia there are a number of known rutile collecting localities. In the Olary District rutile is common across many of the pegmatite and granite areas, so much so that it's occurrence has been noted on mineralogical maps of the region. On Bimbowrie it occurs in the pegmatites near Ameroo Hill, while on Plumbago and Glenorchy it is found in association with quartz veins and davidite.

Above: *25mmTwinned Rutile crystal from the Original Crocker Well uranium deposit on Plumbago Station.*

MINERAL PROFILE - RUTILE (CONTINUED)

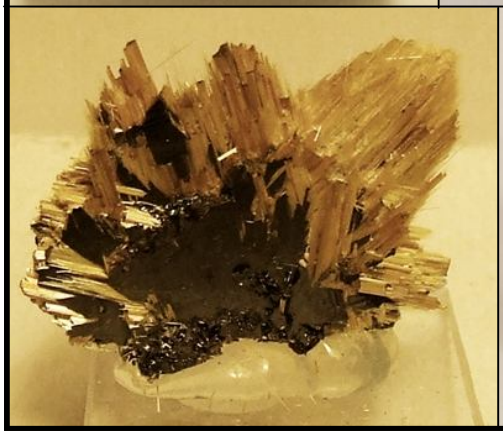
Above Left: *Rutile crystals in quartz to 12 mm from the Walpole Road Quarry near Williamstown, South Australia.*

Above Right: *Single crystal 30mm long from Strathalbyn, South Australia.*

Below Middle: *Two examples of Graves Mountain Rutile crystals from the USA. Left crystal is 60 mm across while the right crystal is 30 mm across.*

Bottom Left: *Radiating cluster of golden acicular rutile crystals on hematite. 25 mm across, from Ibitara, Brazil.*

Bottom Right: *40 mm quartz crystal with 25 mm acicular rutile inclusions, from Ibitara, Brazil.*



The Adelaide Hills have several good collecting areas for rutile crystals. In the Mount Crawford Forest, rutile is found along Walpole Road where a number of diggings existed many years ago. A kaolin quarry at the northern end of Walpole Road has quartz veins intersecting the kaolin and these contain numerous rutiles, with some single crystals reaching 2-3 cm in length. Between 1 - 1.5 km South of this quarry and within the pine plantations are other patches where rutile has been found. At the large kaolin quarry 4km southeast of Williamstown small ruby red rutile crystals were found in association with green mica. One of the most notable occurrences of rutile in the Adelaide Hills is 5 km north of Strathalbyn, where well formed deep red crystals reaching 3-5cm in length were found in quartz.

The Mount Painter area in the northern Flinders Ranges has also produced good rutile crystals. The two noted occurrences are at the Corundum Mine near Mount Pitt and within the pegmatite plugs along the southern length of Arkaroola - particularly Tourmaline Hill.

The Harts Ranges in central Australia are another region where pegmatites were mined, particularly for the large sheets of mica. Associated with the mica at these mines were beryl, quartz, feldspar tourmaline and on occasion rutile. The noted locations are in the vicinity of the Rex Mine near Mount Palmer.

Around the rest of the world the most renown locations for spectacular rutile crystals include :-

Graves Mountain, in Georgia USA, where fist sized crystals with a mirror like metallic sheen have been recovered. These are associated with a red pyrophyllite clay.
Diamantina, Brazil - Where some of the best deep red twinned clusters have been found.
Ibitiara, Brazil - where probably the best rutile included quartz has been found along with spectacular radiating golden rutile acicular crystals in association with hematite.

BROKEN HILL MINERAL CLUB - 2010 CALENDAR

MONTH	FIELD TRIP	MEETING
March	**Corona Amethyst Fields** Sunday 21st – 7:30 am. (90km) Bring Hammers, Chisels, Carry Bags, etc. Meet – Tibooburra Road near Rifle Range.	**Monday 1st - 7:30 pm** **Mineral - Chrysocolla**
April	**No Field Trip**	**Wednesday 31st March** **7:30 pm. Mineral - Stilbite**
May	**Silverton / Mundi Mundi Station Area** Sunday 16th – 8:30 am. (50km) Bring Hammers, Chisels, Carry Bags, Sieves, etc. Meet – Corner Brown St and Silverton Road	**Monday 3rd - 7:30 pm** **Mineral - Actinolite** **Presentation - T Dart** **BHP & THE LINE OF LODE**
June	**Purnamoota Station** Sunday 20th – 7:30 am. (40km) Bring Hammers, Chisels, Carry Bags, etc. Meet – Corner Schlapp St and Nine Mile Road	**Monday 7th - 7:30 pm** **Mineral - Dravite Tourmaline**
July	**Wertago Station - Overnight Camp** Weekend 17th - 18th – 7:00 am. (220km) Bring Hammers, Chisels, Carry Bags, Packing Boxes, Sleeping gear, Food, Water, etc. Meet – Tibooburra Road near Rifle Range.	**Monday 5th - 7:30 pm** **Mineral - Azurite** **Presentation - TBA**
August	**Fairy Hill Copper Mine** Sunday 15th – 8:00 am. (50km) Bring Hammers, Chisels, Carry Bags, etc. Meet – Sydney Road Info Bay	**Monday 2nd - 7:30 pm** **Mineral - Smoky Quartz**
September	**Gem & Mineral Show: ROCK – ON 2010** Show Dates - Friday 24th - Sunday 26th Field Trips - Monday 27th & Tuesday 28th Broken Hill Racecourse & Event Centre	**Monday 6th - 7:30 pm** **Mineral - Hedenbergite**
October	**Olary District – Overnight Camp** Weekend 15th / 16th / 17th – 4:00 pm. (up to 220km) Bring Hammers, Chisels, Carry Bags, Packing Boxes, Sleeping gear, Food, Water, etc. Meet – Adelaide Road Info Bay	**Monday 4th - 7:30 pm** **Mineral - Andradite** **Presentation - TBA**
November	**Barrier Colorado Copper Mine Area** Sunday 21st – 8:30 am (30km) Bring Hammers, Chisels, Carry Bags, etc. Meet – Corner Schlapp St and Nine Mile Road	**Monday 1st - 7:30 pm** **Mineral - Atacamite**
December	**No Field Trip**	**End Of Year Christmas Party** **Monday 6th - 6:00 pm** **Mineral - Find of the Year**

PLEASE NOTE: These field trips are tentative – pending final negotiations with land / lease holders. Demonstrators and Guest Speakers are also tentative, pending final confirmation of availability.